T-9890DSR

Ref. No. 3488

ONKYO SERVICE MANUAL

SYNTHESIZED
FM STEREO/DSR TUNER
MODEL T-9890DSR

Black model

BUP, BUPV	230V AC, 50Hz

SAFETY-RELATED COMPONENT WARNING!!
COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

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ONKYO
AUDIO COMPONENTS

SPECIFICATIONS

Tuning Range	**FM : 87.50 to 108.00MHz (50/25kHz steps)** **DSR(CABLE) : 50 to 855 MHz (1MHz/100kHz steps)** **(SATELLITE) : 950 to 175 MHz (1MHz/100kHz steps) (option)**
Usable Sensitivity	**FM : Mono 10.3 dBf, 0.9 μV (75 ohms IHF)** **0.8 μV (75 ohms DIN)** **Stereo 17.2 dBf, 2.0 μV (75 ohms IHF)** **20 μV (75 ohms DIN)** **DSR : 63 to 94 dBμV**
50 dB Quieting Sensitivity	**FM : Mono 16.1 dBf, 1.7 μV (75 ohms)** **Stereo 36.1 dBf, 17 μV (75 ohms)**
Capture Ratio	**FM : 1.3 dB (Wide)**
Image Rejection Ratio	**FM : 100dB**
IF Rejection Ratio	**FM : 100 dB**
Signal-to-Noise Ratio	**FM : Mono 85 dB, IHF** **Stereo 77 dB, IHF** **DSR : 110 dB, IHF**
Selectivity	**FM : 70 dB DIN (+/- 300kHz at 40 kHz Devi.) (Super-Narrow)**
AM Supperssion Ratio	**FM : 55 dB**
Total Harmonic Distortion	**FM : Mono 0.03 % (Wide)** **Stereo 0.07 % (Wide)** **DSR : 0.007 % (1kHz)**
Frequency Response	**FM : 30 to 15,000 Hz (+0.5, -1.0 dB)** **DSR : 15 to 15,000 Hz (±0.5 dB)**
Stereo Separation	**FM : 45 dB at 1,000 Hz (Wide)** **33 dB at 70 to 10,000 Hz (Wide)** **DSR : 102 dB**
Stereo Threshold	**FM : 17.2 dBf, 2.0 μV (75 ohms)**
Qutput	**FM : 1.0V** **DSR : 2.0V**

SERVICE PROCEDURES

1. Safety-check out

After correcting the original service problem, perform the following safety check before releasing the set to the customer.

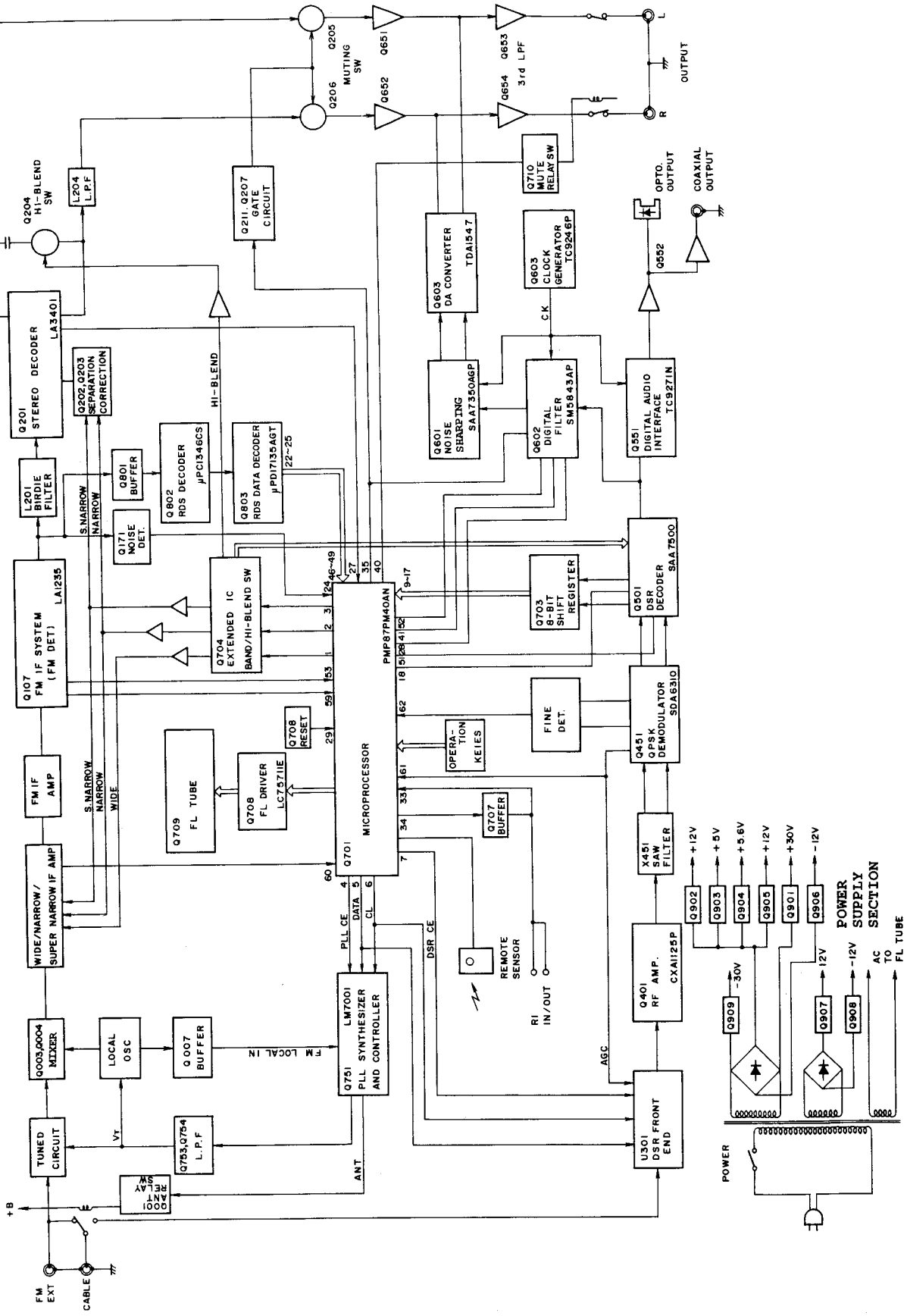
Connect the insulating-resistance tester between the plug of power supply cord and chassis.

Specifications: More than 10MΩ at 500V.

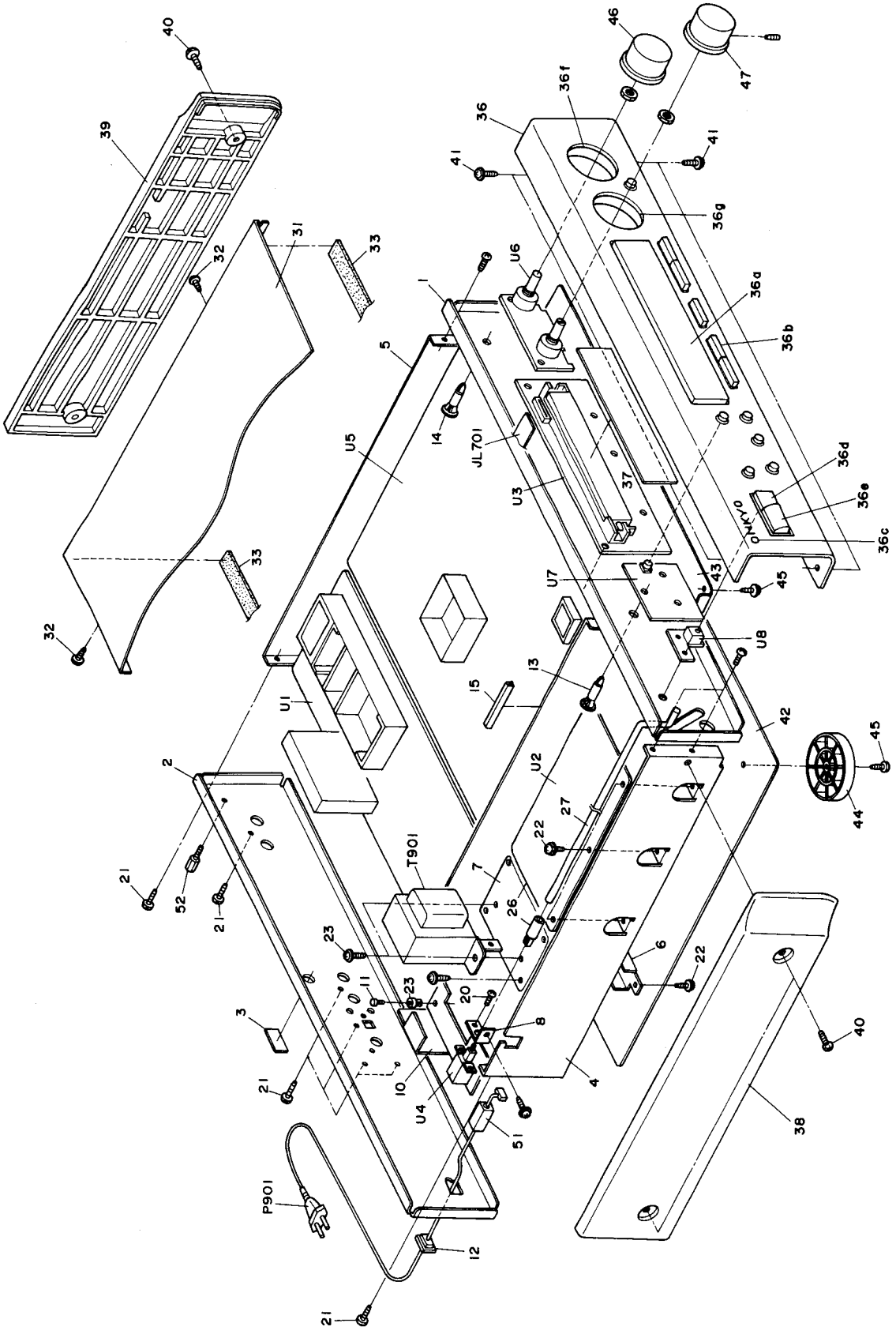
2. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to change the back-up system. Note that since this is not a permanent memory, the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

BLOCK DIAGRAM



EXPLODED VIEW



PARTS LIST

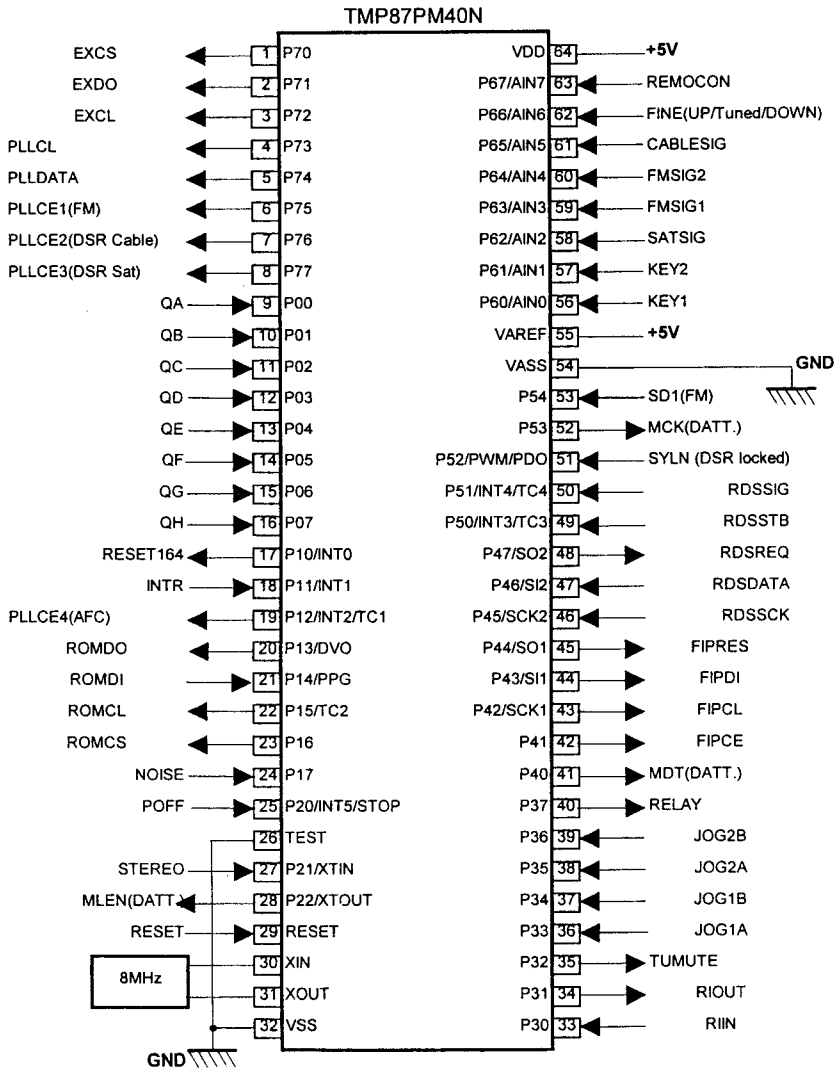
REF. NO.	PART NO.	DESCRIPTION
1	27110709A	Front bracket
2	27121959B	Rear panel
3	29361763	Label
4	27130696A	Bracket L
5	27130697	Bracket R
6	27130698	Bracket PC
7	27141639	Retainer, power transformer
8	27141549	Retainer, power
10	28175212	Isolation plate
11	880009	NPR-345, Plastic rivet
12	27300750	⚠ Cord, bushing
13	27190657	KGLS-18RF, Holder
14	27190266	KGLS-12RT, Holder
15	28170041	CE-016, Bush
20	82143006	3P+6FN(BC), Pan head screw
21	838430088	3TTB+8B(BC), Self-tapping screw
22	838130088	3TTB+8B, Self-tapping screw
23	830440089	4TTC+8C(BC), Self-tapping screw
26	27273152	Joint, power
27	27260323	Shaft, power
31	28184526	Top cover
32	838430088	3TTB+8B(BC), Self-tapping screw
33	28141222	0.15×15×425, Cushion
36	1A557121	Front panel ass'y
36a	28191694	Clear plate
36b	27267850	Guide
36c	28135199	Badge
36d	28191593-1	Clear plate RE
36e	27267851	Guide, power
36f	28324632	Knob SEL
36g	28325049	Knob FREQ

REF. NO.	PART NO.	DESCRIPTION
37	28133332A	Back plate
38	28185369	Side panel L
39	28185370	Side panel R
40	837440169	4TTT+16C(BC), Self-tapping screw
41	838430088	3TTB+8B(BC), Self-tapping screw
42	27170290	Bottom board L
43	27170291	Bottom board R
44	27175254	Leg
45	838430088	3TTB+8B(BC), Self-tapping screw
46	28325050	Knob RDS
47	28325051	Knob AUTO
51	230917	⚠ SFC-5, Core
52	25060044	Antenna terminal
JL701	2047161012	NCFC7-161012, Flexible flat cable
P901	253193HIT	⚠ AS-CEE, Power supply cord
T901	2301048B	⚠ NPT-1222P, Power transformer
U1	1A557578-1	NARF-5078-1, Front end and output pc board ass'y
U2	1A557579-1	NAPS-5079-1, Power supply circuit pc board ass'y
U3	1A557580-1	NADIS-5080-1, Display circuit pc board ass'y
U4	1A557581-1	NASW-5081-1, Power switch pc board ass'y
U5	1A557582-1	NADG-5082-1, Digital circuit pc board ass'y
U6	1A557583-1	NASW-5083-1, Rotary encoder pc board ass'y
U7	1A557584-1	NASW-5084-1, Operation switch pc board ass'y
U8	1A557585-1	NADG-5085-1, Remote sensor pc board ass'y

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

MICROPROCESSOR CONNECTION DIAGRAM

TMP87PM40AN(Microprocessor)



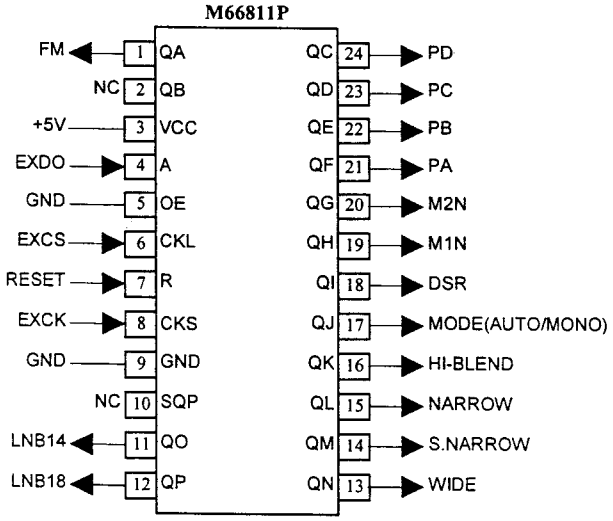
TERMINAL DESCRIPTIONS

Pin No.	Symbol	I/O	Description
1	EXCS	O	Latch signal output to extended IC M66311P. Connect to the terminal CKL of latch clock input.
2	EXDO	O	Data output to extended IC M66311P. Connect to the terminal A of serial data input.
3	EXCL	O	Shift clock output to extended IC M66311P. Connect to the terminal CKS of serial data input.
4	PLLCL	O	Serial clock output.
5	PLLDATA	O	Serial data output.
6	PLLCE1	O	Chip enable terminal to PLL IC LM7001.
7	PLLCE2	O	Chip enable terminal to PLL for DSR cable.
8	PLLCE3	O	Chip enable terminal to PLL for DSR satellite.
9	QA	I	Parallel data input from SAA7500.
10	QB	I	
11	QC	I	
12	QD	I	
13	QE	I	
14	QF	I	
15	QG	I	
16	QH	I	
17	RESET164	O	Reset output to HC164.
18	INTR	I	Parity data read timing pulse input.
19	PLLCE4	O	Chip enable terminal to PLL IC for DSR AFC.
20	ROMDO	O	Serial data output terminal to EEPROM TC89102P for data back-up memory.
21	ROMDI	I	Serial data input terminal from EEPROM TC89102P for data back-up memory.

Pin No.	Symbol	I/O	Description
22	ROMCL	O	Serial clock output terminal to EEPROM TC89102P for data back-up memory.
23	ROMCS	O	Chip select output terminal to EEPROM TC89102P for data back-up memory.
24	NOISE	I	FM noise signal input
25	POFF	I	Stoppage current detection input.
26	TEST		Test terminal.
27	STEREO	I	FM noise signal input.
28	MLEN	O	Data latch signal output to digital attenuator for speech volume control.
29	RESET	I	Reset terminal
30	XIN	I	Resonator connection terminal
31	XOUT	O	Connect the 8.0 MHz ceramic resonator.
32	VSS		Ground terminal.
33	RIIN	I	System code input terminal.
34	RIOUT	O	System code output terminal.
35	TUMUTE	O	Muting control output.
36	JOG1A	I	Pulse input of frequency jog dial.
37	JOG1B	I	Pulse input of frequency jog dial.
38	JOG2A	I	Pulse input of selector jog dial.
39	JOG2B	I	Pulse input of selector jog dial.
40	RELAY	O	Relay control output terminal for selector.
41	MDT	O	Data signal output to digital attenuator for speech volume control.
42	FIPCE	O	Chip enable output to FL tube.
43	FIPCL	O	Serial clock output to FL tube.

Pin No.	Symbol	I/O	Description
44	FIPDO	O	Serial data output to FL tube.
45	FIPRES	O	Reset output to FL tube.
46	RDSSCK	I	Serial clock input to RDS decoder.
47	RDSDATA	I	Serial data input to RDS decoder.
48	RDSREQ	O	RDS data request signal output to RDS decoder.
49	RDSSTB	I	Data strobe input to RDS decoder.
50	RDSSIG	I	RDS detection signal input.
51	SYLN	I	DSR synchronizing detection input.
52	MCK	O	Clock signal output to digital attenuator for speech volume control.
53	SD1	I	FM field detector signal input.
54	VASS		Ground terminal for A/D converter.
55	VAREF		Power source terminal for A/D converter.
56	KEY1	I	Operation key connection terminal.
57	KEY2	I	Operation key connection terminal.
58	SATSIG	I	DSR satellite signal A/D input.
59	FMSIG1	I	FM signal input.
60	FMSIG2	I	FM signal input.
61	CABLESIG	I	DSR cable signal input.
62	FINE	I	Signal input for DSR tuning guide indication.
63	REMOCON	I	Remote control signal input.
64	VDD		Power source terminal. (+5V)

Extended IC (M66311P)

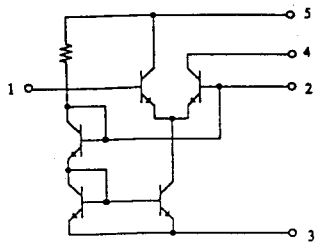


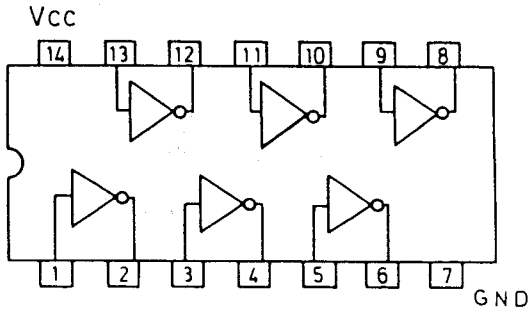
Pin No.	Symbol	I/O	Description
1	FM	O	Power source control signal output for FM.
2	NC		Not connected.
3	Vcc		Power source terminal. (+5V)
4	EXD	O	I Serial data input terminal.
5	OE		Chip enable terminal. Connect to the ground terminal.
6	EXCS	I	Latch clock input terminal.
7	R	I	Reset input.
8	EXCK	I	Shift clock input.
9	GND		Ground terminal.
10	SQP		Open terminal.
11	LNB14	O	Change from LNC to vertical polarized wave 14.
12	LNB18	O	Change from LNC to vertical polarized wave 18.
13	WIDE	O	Wide band control output.
14	S.NARROW	O	Super narrow band control output.
15	NARROW	O	Narrow control output.
16	HI-BLEND	O	Hi-blend control output.
17	MODE	O	AUTO/MONO change output.
18	DSR	O	Power source control signal output fot DSR.
19	MIN	O	Playback channel change output for DSR.
20	M2N	O	
21	PA	O	Select channel change output for DSR.
22	PB	O	
23	PC	O	
24	PD	O	

LNC: Low Noise Converter

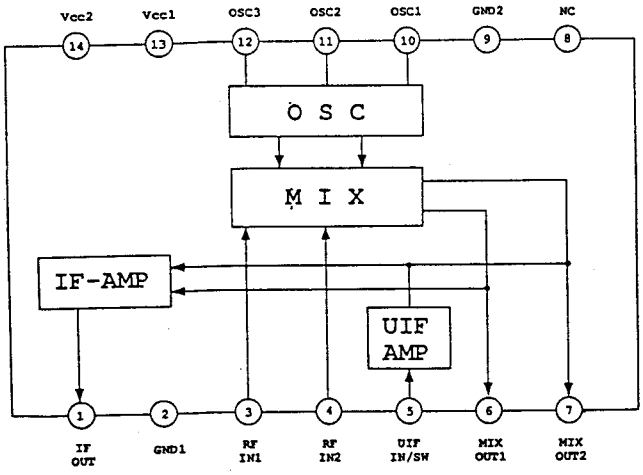
IC BLOCK DIAGRAMS AND DESCRIPTIONS

BA401 (FM IF Amp.) TC74HCU04P/74HC04P (Hex Inverter)



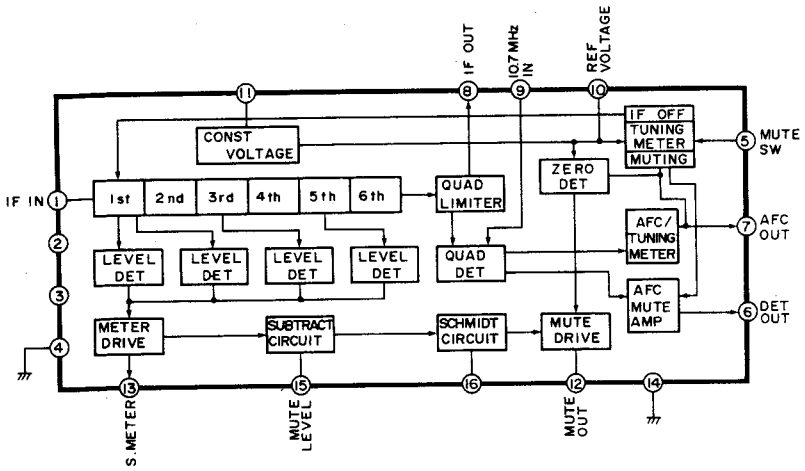


CXA1125P(CATV/VHF Tuner)

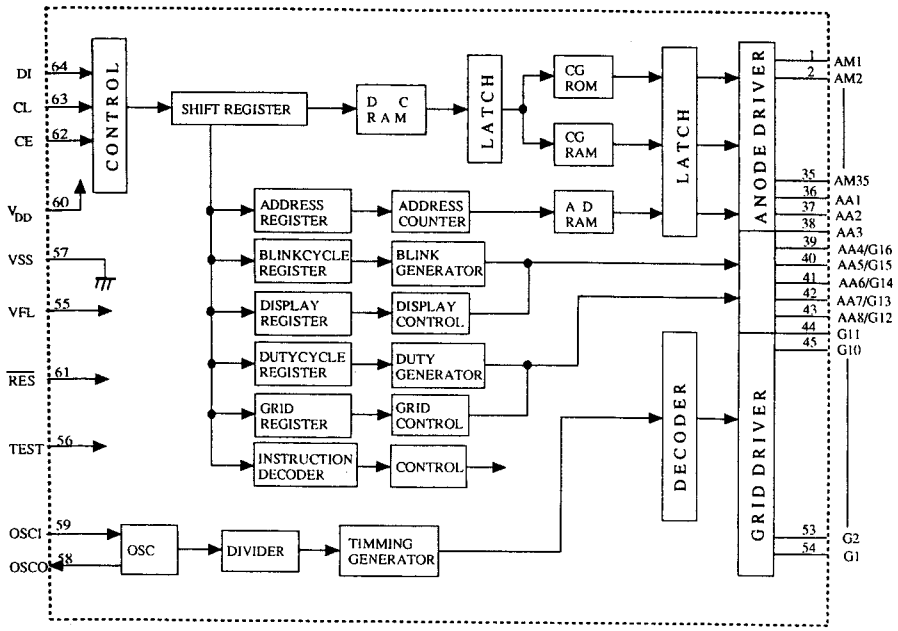


Pin No.	Symbol	Description
1	IF OUT	IF signal output.
2	GND1	Ground terminal for IF amplifier system.
3	RF IN1	RF signal input 1.
4	RF IN2 RF	signal input 2
5	UIF IN/SW	UIF signal input/ON when UIF and OFF when VHF.
6	MIX OUT1	Mixing output 1.
7	MIX OUT2	Mixing output 2.
8	NC	Not connected.
9	GND2	Ground terminal.
10	OSC1	Oscillator output 1.
11	OSC2	Oscillator output 2.
12	OSC3	Oscillator output 3.
13	Vcc1	Power source for oscillator and mixer.
14	Vcc2	Power source for IF/UIF amplifier.

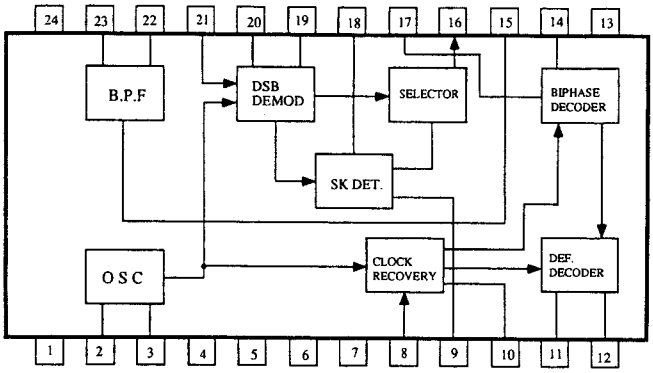
LA1235 (FM IF system)



LC75711E(FL Tube Driver)

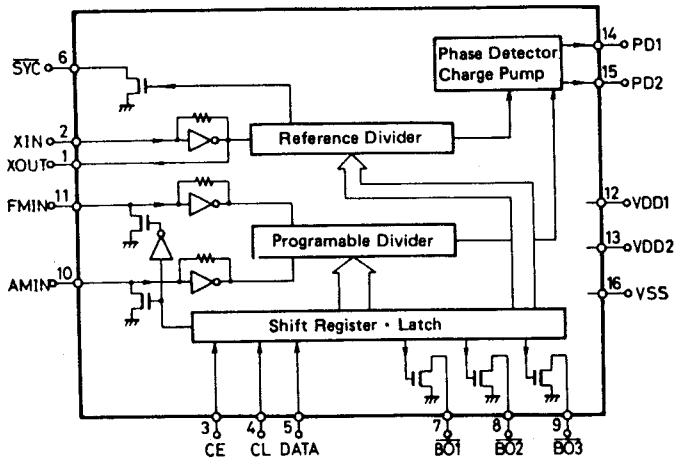


μPC1346CS (RDS Decoder)



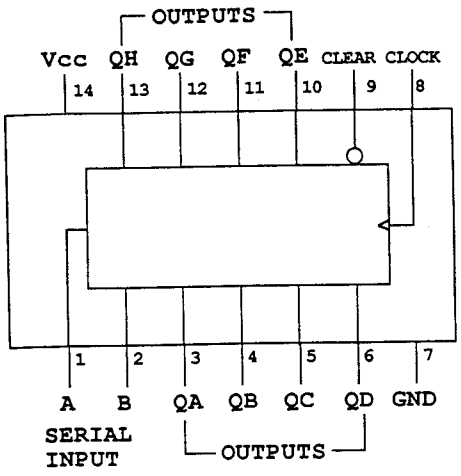
No.	Terminal	Description	No.	Terminal	Description
1	Vcc	Supply voltage for the digital circuit	13	GND	Ground for the analog circuit
2	OSC IN	Resonator input	14	INTEG	Integrating filter terminal
3	OSC OUT	Resonator output	15	BPF ADJ	Adjustment fc band pass filter
4	GND	Ground for the digital circuit	16	PSK OUT	Biphase signal output
5	TEST1	Test unput	17	PSK IN	Biphase decoder input
6	REST2	Test input	18	LPF SK	Low pass filter for the detection SK
7	OP.CTL	Control input of the operation stop	19	LPF Q	Low pass filter for the crossed detector
8	S/L CTL	Mode control input of the synchonizing detection	20	LPF I	Low pass filter for the synchronizing detector
9	SK OUT	SK detection output	21	DSB IN	DSB demodulator circuit input
10	RDS OUT	RDS synchonizing detection output	22	BPF OUT	Band pass filter output
11	CLOCK OUT	Bit rate clock output	23	BPF IN	Band pass filter input
12	DATA OUT	RDS data output	24	Vcc	Supply voltage for analog circuit

LM7001 (PLL Synchesizer and Controller)



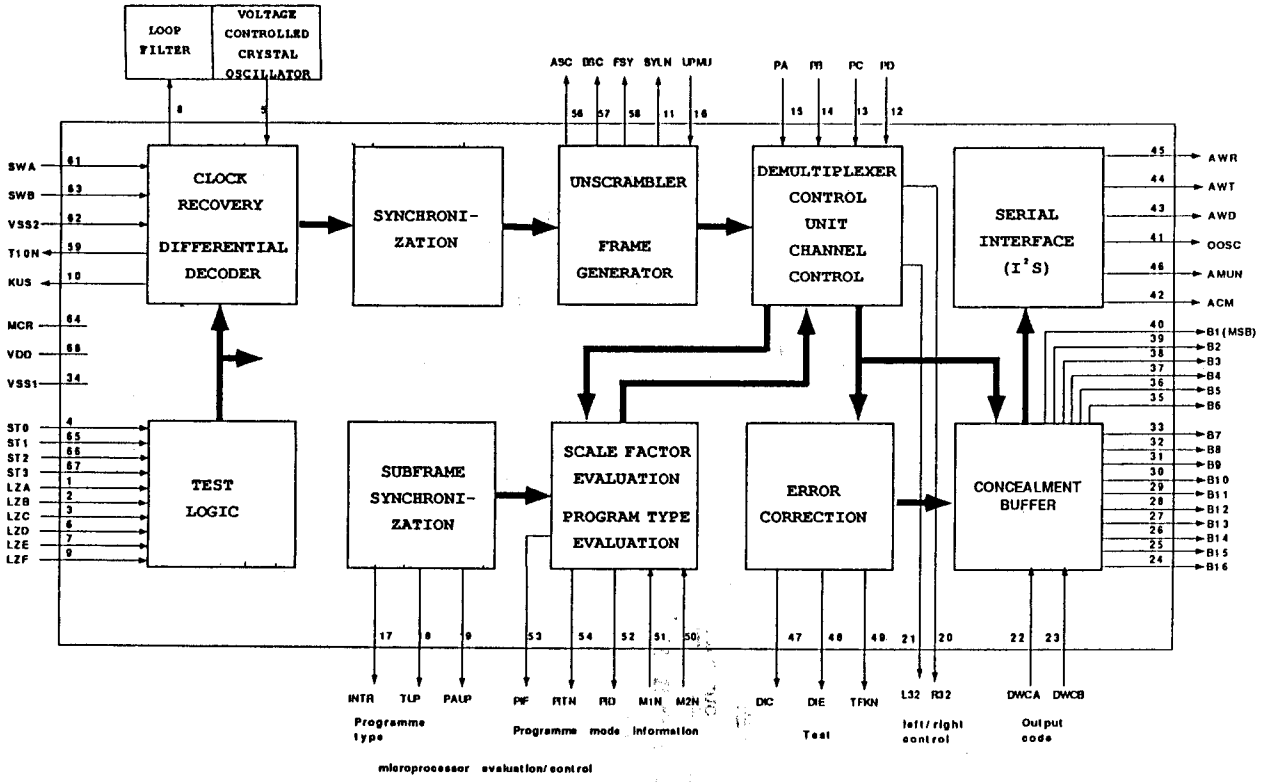
Pin No.	Terminal	Description
1	XOUT	Connect the 7.2MHz crystal resonator.
2	XIN	
3	CE	Chip enable terminal. Connect to the terminal PLLCE1 of microprocessor.
4	CL	Serial clock input terminal. Connect to the terminal PLLCL of microprocessor.
5	DATA	Serial data input terminal. Connect to the terminal PLLDATA of microprocessor.
6	$\overline{SYN}$	Not used.
7	$\overline{SAT}$/CANLE	Power source control terminal for DSR. Cable at the high level and Satellite at low.
8	LPF	LPF selector output.
9	ANT	Antenna selector output. A at high level and B at low level.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator input terminal.
12	VDD1	Power source terminal for back-up.
13	VDD2	Power source terminal.
14	PD1	Phase comparator output
15	PD2	Phase comparator output
16	Vss	Ground terminal

74HC164 (8-bit Serial-in/Parallel-out Sfift Register)

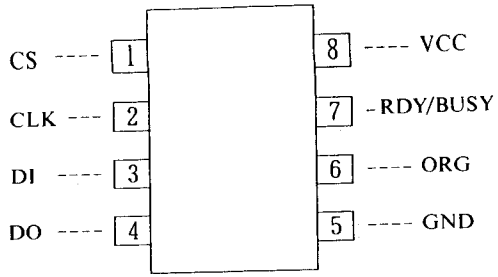


Inputs				Outputs	
Clear	Clock	A	B	QA QB	QH
L	×	×	×	L L	L
H	L	×	×	QAO QBO	QHO
H	↑	H	H	H QAn	QGn
H	↑	L	×	L QAn	QGn
H	↑	×	L	L QAn	QGn

SAA7500 (Digital Satellite Radio Broadcasting Tuner Decoder)



TC89102P (2048-bit EEPROM)

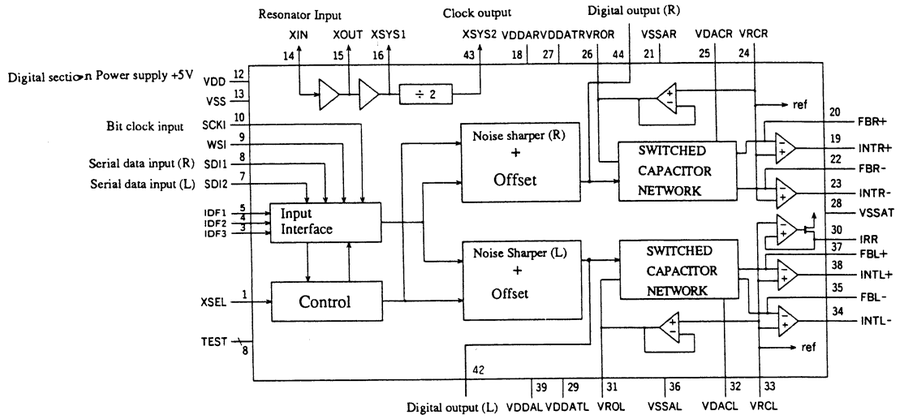


Pin No.	Symbol	Description
1	CS	Chip selector input terminal
2	CLK	Clock input terminal
3	DI	Serial data input termial
4	DO	Serial data output terminal
5	GND	Ground terminal
6	ORG	Memory constructional selector input terminal
7	RDY/BUSY	Status output terminal
8	VCC	Power supply terminal

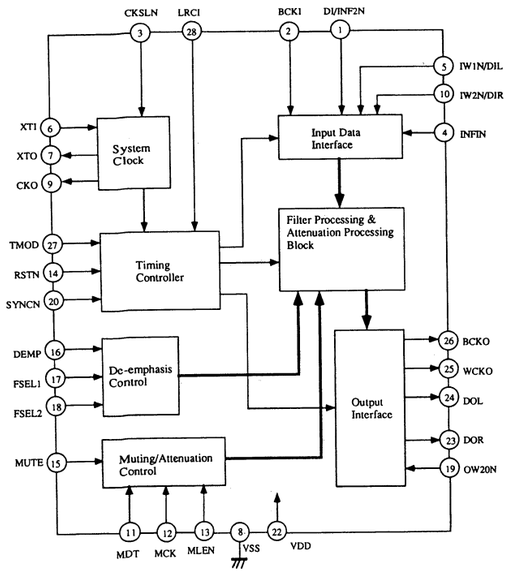
Pin No..	Symbol	I/O	Description	Pin No.	Symbol	I/O	Description
1	LZA	I(3)	Pase adjustment for the internal clock.	42	ACM	O	Concealment flag (for SM5843AP).
2	LZB	I(3)	Phase adjustment for the internal clock.	43	AWD	O	Aundio data (for SM5843AP).
3	LZC	I(3)	Phase adjustment for the internal clock.	44	AWT	O	Bit clock (for SM5843AP).
4	STO	I(3)	Control input for testing.	45	AWR	O	Word select signal (for SM5843AP).
5	T20N	I(1)	20.48 MHz clock input from voltage controlled oscillator (VCO)	46	AMUN	O	Muting signal (for SM5843AP).
6	LZD	I(3)	Control input for testing.	47	DIC	O	Data output for testing.
7	LZE	I(3)	Control input for testing.	48	DIE	O	Data output for testing.
8	PHD	O	Phase control signal for VCO.	49	TFKN	O	Burst clock for test data.
9	LZF	I(3)	Control input for testing.	50	M2N	I(2)	Channel mode select input.
10	KUS	O	Test output (A'B' swap).	51	M1N	I(2)	Channel mode select input.
11	SYLN	O	Synchronization indication flag.	52	PID	O	Program information (PI) interface ourput (data).
12	PD	I(3)	Program number input selector (MSB).	53	PIF	O	Program information (PI) interface output (window signal).
13	PC	I(3)	Program number input selector.	54	PITN	O	Program inforation (PI) interface output (clock).
14	PB	I(3)	Program number input selector.	55	n.c		Not connected.
15	PA	I(3)	Program number input selector (LSB).	56	ASC	O	Data output for 10.24 Mbit/s interface.
16	UPMU	I(3)	Muting input (controlled by microprocessor).	57	BSC	O	Data output for 10.24 Mbit/s interface.
17	INTR	O	Interrupt flag for microprocessor).	58	FSY	O	Window signal for 10.24 Mbit/s interface.
18	TUP	O	Program type interface (clock).	59	T10N	O	10.24 MHz clock output.
19	PAUP	O	Program type inerface (data).	60	n.c		Not connected.
20	R32	O	Multiplex control signal for right channel.	61	SWA	I(2)	10.24 Mbit/s data input.
21	L32	O	Multiplex control signal for left channel.	62	Vss2		Ground.
22	DWCA	I(3)	DA-converter mode select input.	63	SWB	I(2)	10.24 Mbit/s data input.
23	DWCB	I(3)	DA-converter mode select input.	64	MCR	I(1)	Master rest.
24-33	B16-7	O	Audio data for parallel interface, bits 16 (LSB) to 7.	65	ST1	I(3)	Control input for testing.
34	Vss1		Ground terminal.	66	SR2	I(3)	Control input for testing.
35-40	B6-1	O	Audio data for parallel interface, bits 6 to 1 (MSB).	67	ST3	I(3)	Control input for testing and mode select for 10.24 Mbit/s interface.
41	OOSC	O	4.096 MHz clock output.	68	CDD		Power supply.

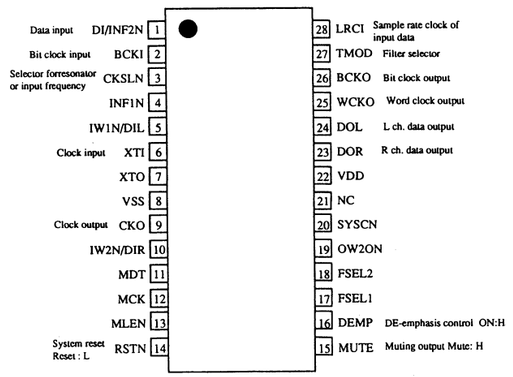
SAA7350AGP (Noise Sharper)

Pin No.	Mark	Function
1	XSEL	Crystal frequency select. This pin is used to select the master srystal frequency as follows: -XSEL
		HIGH=384fs XSEL LOW=256fsThis pin defaults to XSEL HIGH when not connected.
2	DOEN	Onc-bit Digital Output Enable. When LOW, the one-bit code outputs are made available for DAC7.
		(not used).
3	IDF3	Input data formal. These three pins determine the input format the device is to operate in. If
4	IDF2	unconnected these pins will default HIGH (i.c. burst clock mode).
5	IDF1	
6	TEST4	This pin should be lrft open circuit.
7	SD12	Serial Data Input. Used in simultaneous mode only (for the right channel signal).
		When not used, this pin will be internally pulled high.
8	SDI1	Serial Data Input. This should be a 16, 18 or 20-bit linear 2's complement PCM signal.
		In simultaneous mode this pin is used for the left channel signal.
9	WSI	Serial input Word Select Signal. Signifies whether data word is for the left or right channel. Can be either fs,
		2fs, 4fs or 8fs where fs is the system sampling frequency. fs can lie between 16kHz and 53kHz.
10	SCKI	Bit clock input for the serial input interface.
11	TEST1	This pin should be left open circuit.
12	VDD	5V power supply for digital section.
13	VSS	Ground connection for the digital section.
14	XIN	Crystal Oscillator Input.
15	XOUT	Crystal Oscillator Output.
16	XSYS1	Buffered Oscillator Output.
17	TEST5	In normal operation this pin should be tied LOW.
18	VDDAR	Analogue 5V supply for right channel.
19	INTR+	Output from the right positive switched-capacitor integrator. Input to differential op-amp.
20	FBR+	Feedback connection for the right positive switched-capacitor integrator.
21	VSSAR	0V supply for right channel.
22	FBR-	Feedback connection for the right negative switched-capacitor integrator.
23	INTR-	Output fron the right negative switched-capacitor integrator. Input to differential op-amp.
24	VRCR	High impedance voltage reference for the right channel inputs. typically VDDAR/2.
25	VDACR	Reference voltage supply for right channel DAC's. Normally this will be connected to VSS.
26	VROR	Right channel voltage reference output. Typically VDDAR/2.
27	VDDATR	5V supply for right channel analogue timing.
28	VSSAT	0V supply for left and right channel analogue.
29	VDDATL	5V supply for left channel analogue timing.
30	IRR	24 kohm bias resistor connection for the reference current generator circuit.
31	VROL	Left channel voltage reference output. Typically VDDAL/2.
32	VDACL	Reference voltage supply for left channel DAC. Normally this will be connected to VSS.
33	VRCL	High impedance voltage reference for left channel inputs and for bias current generator.
		Typically VDDAL/2.
34	INTL-	Output from left negative switched capacitor integrated. Input to differential op-amp.
35	FBL-	Feedback connection for the left negative switched-capacitor integrator.
36	VSSAL-	0V supply for left channel.
37	FBL+	Feedback connection for the left positive switched-capacitor integrator.
38	INTL+	Output from the left positive switched-capacitor integrator.
		Input to differential op-amp.
39	VDDAL	Analogue 5V supply for left channel.
40	TEST2	This pin should be left open circuit.
41	TEST3	This pin should be left open circuit.
42	DOL	Digital output left. Left channel one-bit code for DAC7, when disabled this pin will be driven
		LOW. (Not used).
43	XSYS2	Output clock at a frequcncy of half the master clock frequency.
44	DOR	Digital output right. Right channel one-bit code for DAC7, when disabled this pin will be driven
		LOW. (not used.)

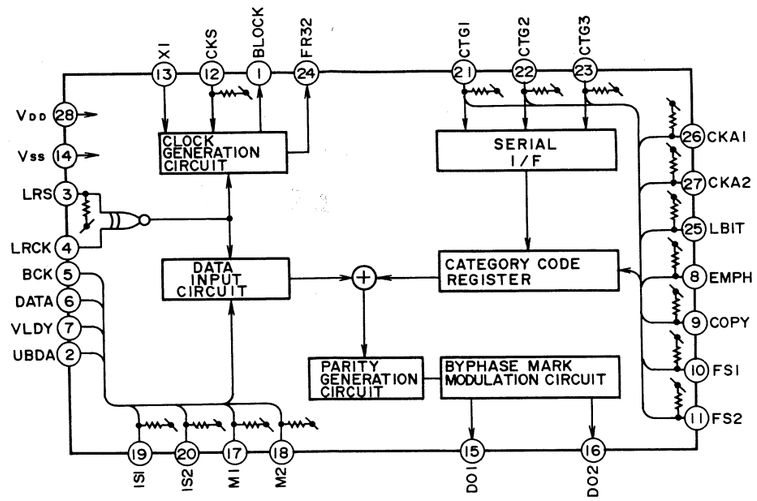


SM5843AP (8 times Oversampling Digital Filter)



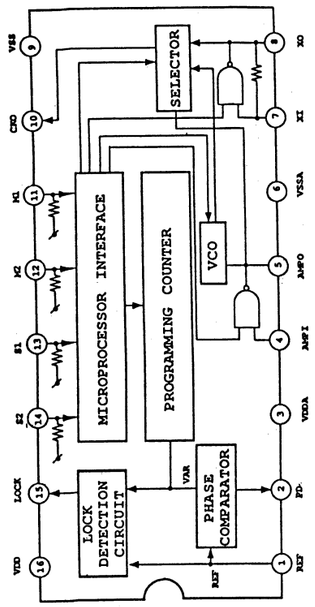


TC9271N (Digital AUDIO Interface Modulation)



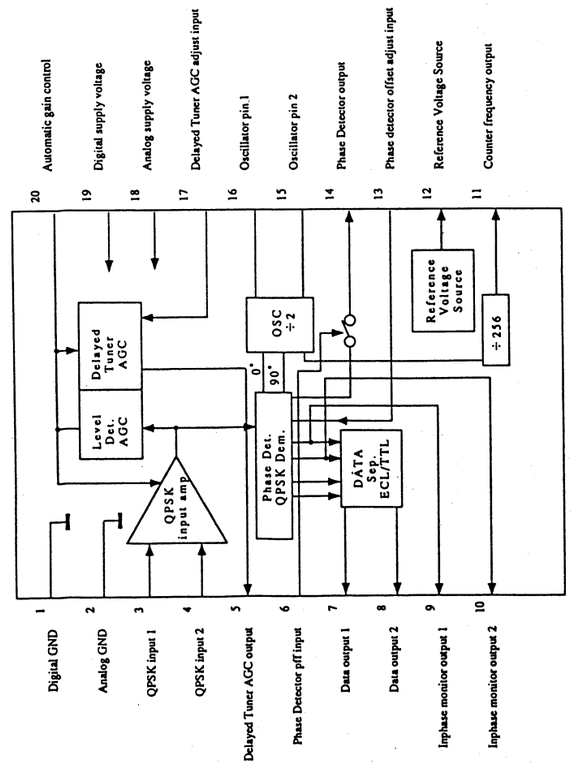
Pin No.	Symbol I	I/O	Description			
1	BLOCK	O	Block first position output			
2	UBDA	I	User bit data input			
3	LRS	I	Polarity setting terminal of LRCK			
4	LRCK	I	LR clock input			
5	BCK	I	Bit clock input			
6	DATA	I	2ch.	Data input	4ch.	Data input 1
7	VLDY	I	2ch.	Correction flag input	4ch.	Data input 2
8	EMPH	I	Emphasis flag setting input			
9	COPY	I	P	Copy flag setting input	S	Fixed at high level
10	FS1	I	Sampling frequency setting input 1			
11	FS2	I	Sampling frequency setting input 2			
12	CKS	I	Setting input of dividing number of clock			
13	XI	I	Clock input			
14	Vss		Ground terminal			
15	DO1	O	Digital data output 1			
16	DO2	O	Digital data output 2			
17	M1	I	Channel mode setting terminal 1			
18	M2	I	Channel mode setting terminal 2			
19	IS1	I	Data input mode setting terminal 1			
20	IS2	I	Data input mode setting terminal 2			
21	CTG1	I	P	Category code setting input 1	S	Data input
22	CTG2	I	P	Category code setting input 2	S	Clock input
23	CTG3	I	P	Category code setting input 3	S	Latch pulse input
24	FR32	O	FR32 output			
25	LBIT	I	P	LBIT input	S	32/192 bit selector
26	CKA1	I	P	Clock precision setting input 1	S	Fixed at high level
27	CKA2	I	P	Clock precision setting input 2	S	Output inhibit at high level
28	VDD		Power source terminal			

TC9246P(Clock Generation IC)

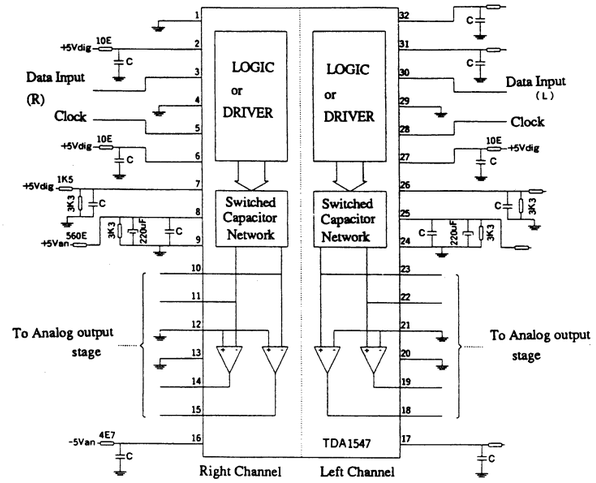


PIN NO.	SYMROL	I/O	DESCRIPTION
1	REF	I	Reference signal input
2	PD	O	Phase error signal output
3	VDDA		Analog power source terminal
4	AMPI	I	Amplifier input for LPF or Oscillator 1
5	AMPO	O	Amplifier output for LPF or Oscillator 1
6	VSSA		Analog ground terminal
7	XI	I	Amplifier input for Oscillator 3
8	XO	O	Amplifier output for Oscillator 3
9	Vss		Digital ground terminal
10	CKO	O	Clock output
11	M1	I	Mode selector terminal
12	M2	I	Mode selector terminal
13	S1	I	Dividing ration selector at parallel mode Microprocessor data input at serial mode
14	S2	I	Dividing ration selector at parallel mode Shift clock input at serial mode
15	LOCK	O	Lock detector signal input
16	VDD		Digital power source terminal

SDA6310 (DSR QPSK Demodu lation)

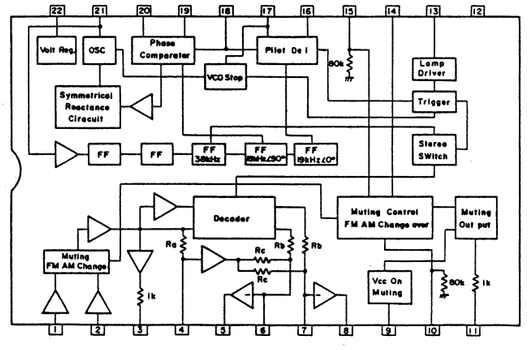


TDA1547 (D/A Converter)



Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	DGND	Digital ground	17	VDDA	Power supply +5V
2	VDDD	Digital power supply +5V	18	DNDPL	Negative output for left channel
3	DATA R	Serial 1 bit data input	19	DOPL	Positive output for left channel
4	NC		20	NC	
5	CLKR	Clock input for right channel	21	AGNDL	Analog ground
6	VDDDR	Power supply +5V	22	OUTL	Positive DAC output for left channel
7	VSSDR	Power supply -3.5V	23	OUTNL	Negative DAC output for left channel
8	VREFR	Reference power supply -4V	24	AGNDL	Analog ground
9	AGND R	Analog ground	25	VREFR	Reference power supply -4V
10	OUTPUT	Negative DAC output for right channel	26	VSDGL	Power supply -3.5V
11	OUT R	Positive DAC output for right channel	27	VDDGL	Power supply +5V
12	AGND R	Analog ground	28	CLKL	Clock input for left channel
13	NC		29	NC	
14	DOPR	Positive output for right channel	30	DATAL	Serial 1 bit data input for left channel
15	DNOPR	Negative output for right channel	31	VSSDG	Power supply -5V
16	VSSA	Power supply -5V	32	SUB	Power supply -5V

LA3401 (FM Stereo Decoder)



ADJUSTMENT PROCEDURES

Preparation

● Input

FM mono: 1 kHz, 40 kHz devi., 60dB/ μ V (65 dBf)

FM stereo: 1 kHz, L+R 37kHz devi.,: Pilot signal 19 kHz

3 kHz devi.

● Test Mode

Press and hold down the MEMORY button, then press the POWER button.

The all segments on the fluorescent indicator tube light on.

● Selector

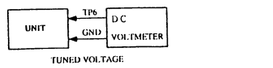
Antenna: A

IF BAND: WIDE

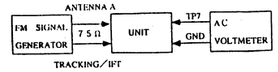
HI-BLEND: OFF

MODE: AUTO

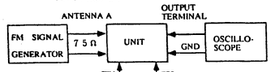
FINE: light on



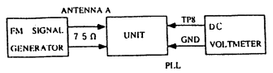
TUNED VOLTAGE



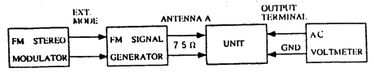
TRACKING/IFT



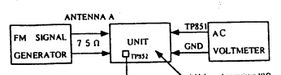
MUTING



PLL

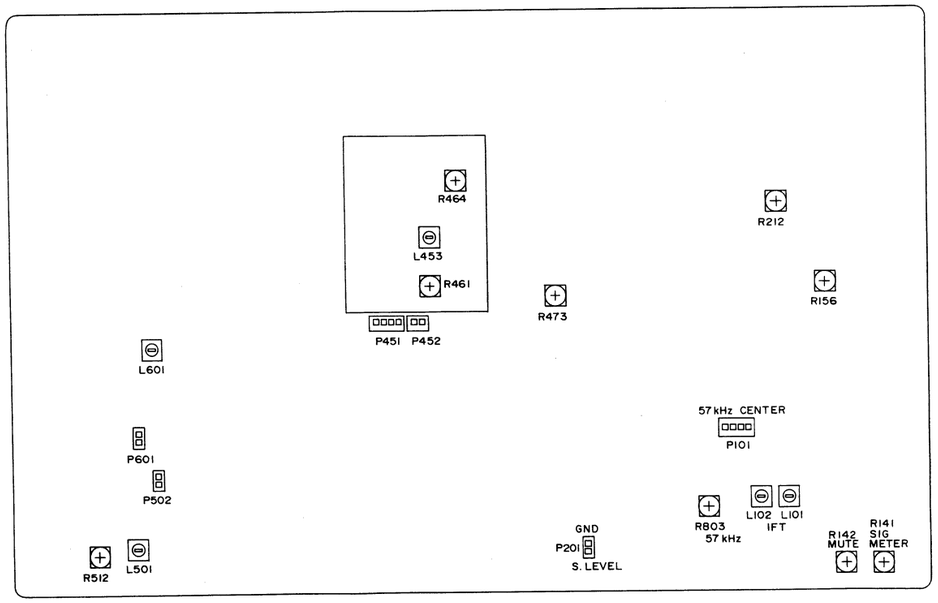


MPX



DYNAS

	Item	Step	Connection of instrument	FM SG output	Stereo Modulator output	Tuned frequency	Output indicator	Adjustment point	Adjust for	Remarks
1	Tuned Voltage	1	Connect the DC voltmeter to the test point P002.			87.5 MHz (1 ch.)	DC voltmeter	L006	5.8±0.2 V	(1 ch.): Channel of PRESET key
		2				108.00 MHz (2 ch.)		C025	24.0±0.4 V	Repeat the steps 2 and 3 until
		3				87.5MHz		L006	4.0±0.2 V	no further adjustment is necessary.
2	Tracking Adjust.	1	Connect the FM signal generator to Antenna terminal A.	100.80 MHz 20 dB μ		100.80 MHz	DC voltmeter	C002,C008 C011,C014	Maximum	Repeat the steps 1 and 2 until no further adjustment is necessary.
		2		87.50 MHz 20 dB μ		87.50 MHz		L001,L002 L003,L004	Maximum	
		3	Connect the DC voltmeter to the test point P201.	100.80 MHz 20 dB μ		100.80 MHz		L005 L009	Maximum	
3	Signal Meter	1	Connect the FM signal generator to Antenna terminal A.	99.00 MHz 50 dB μ		99.00 MHz (5 ch.)	Signal Meter	R141	45 dB	Press the DISPLAY key more than 1 sec. (Signal meter indication)
		2		99.00 MHz 86 dB μ				R156	85 dB	After adjustment, press the DISPLAY key (Frequency indication)
4	FM IF	1	Connect the AC voltmeter across the pins 3 and 4 of P101 and the distortion analyzer to output terminal.	99.00 MHz 60 dB μ		99.00 MHz (5 ch.)	DC voltmeter	L101	0±5 mV	Repeat the steps 1 and 2 until no further adjustment is necessary.
		2					Distortion analyzer	L102	Minimum	
5	Muting level		Connect the oscilloscope to the output terminal.	99.00 MHz 15 dB μ 22.5 kHz devi.		99.00 MHz	Oscilloscope	R142	Appear the signal on the oscilloscope.	
6	Stereo Separation		Connect the oscilloscope to the output terminal.	99.00 MHz 60 dB μ Ext. mode	L ch.	99.00 MHz	Oscilloscope	R212	Minimum (Right ch.)	Maximum and same separation
					Rch.				Minimum (Left ch.)	
7	RDS		Connect the oscilloscope across the pins 1 and 2 of the test point P101.	99.00 MHz 60 dB μ Ext. mode	57 kHz 3% devi. or RDS data signal	99.00 MHz	Oscilloscope	R803	Maximum	



FRONT END AND OUTPUT PC BOARD

DSR adjustment

1.QPSK modulator adjustment

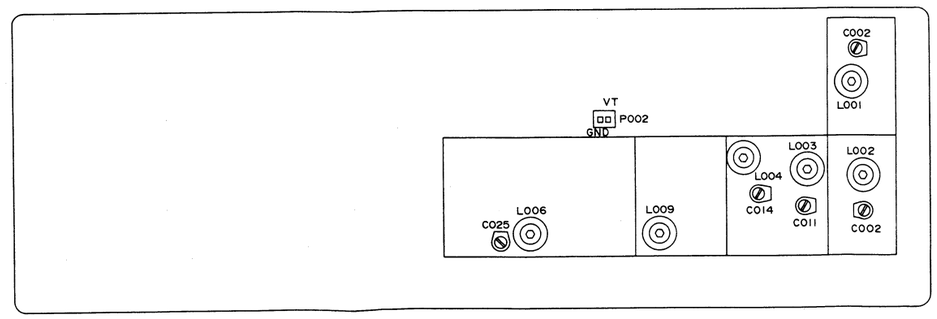
Connect the cable of cable broadcast to the antenna terminal CABLE.
Set the tuned frequency to 118 MHz.
Connect the DC voltmeter to #4 of terminal P451.
Adjust L453 so that Voltmeter reading becomes 6±0.2V.
Connect the oscilloscope to #1 of terminal P451.
Confirm that the eye pattern appears on the oscilloscope.
Connect the DC voltmeter to terminal P452.
Adjust R473 so that Voltmeter reading becomes -3±0.2V.

2.Clock frequency adjustment

Connect the oscilloscope to #1 of terminal P502.
Adjust R512 so that the waveform becomes 0 V.
Connect the oscilloscope to #2 of temrinal P502.
Adjust L501 so that the waveform becomes maximum.

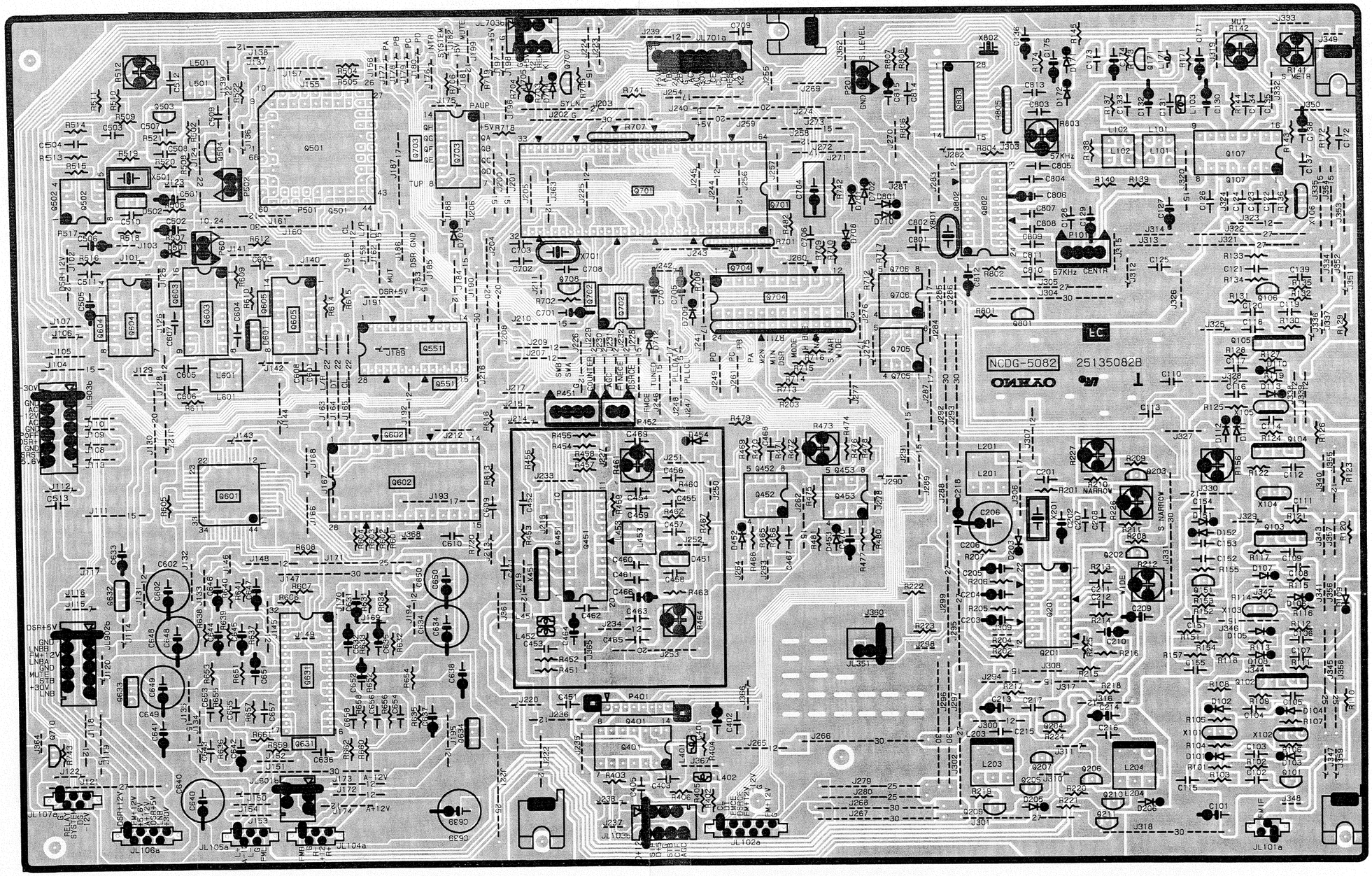
3.Secondary PLL adjustment

Connect the AC voltmeter to terminal P601.
Adjust L601 so that the Voltmeter reading becomes 2±0.2V.



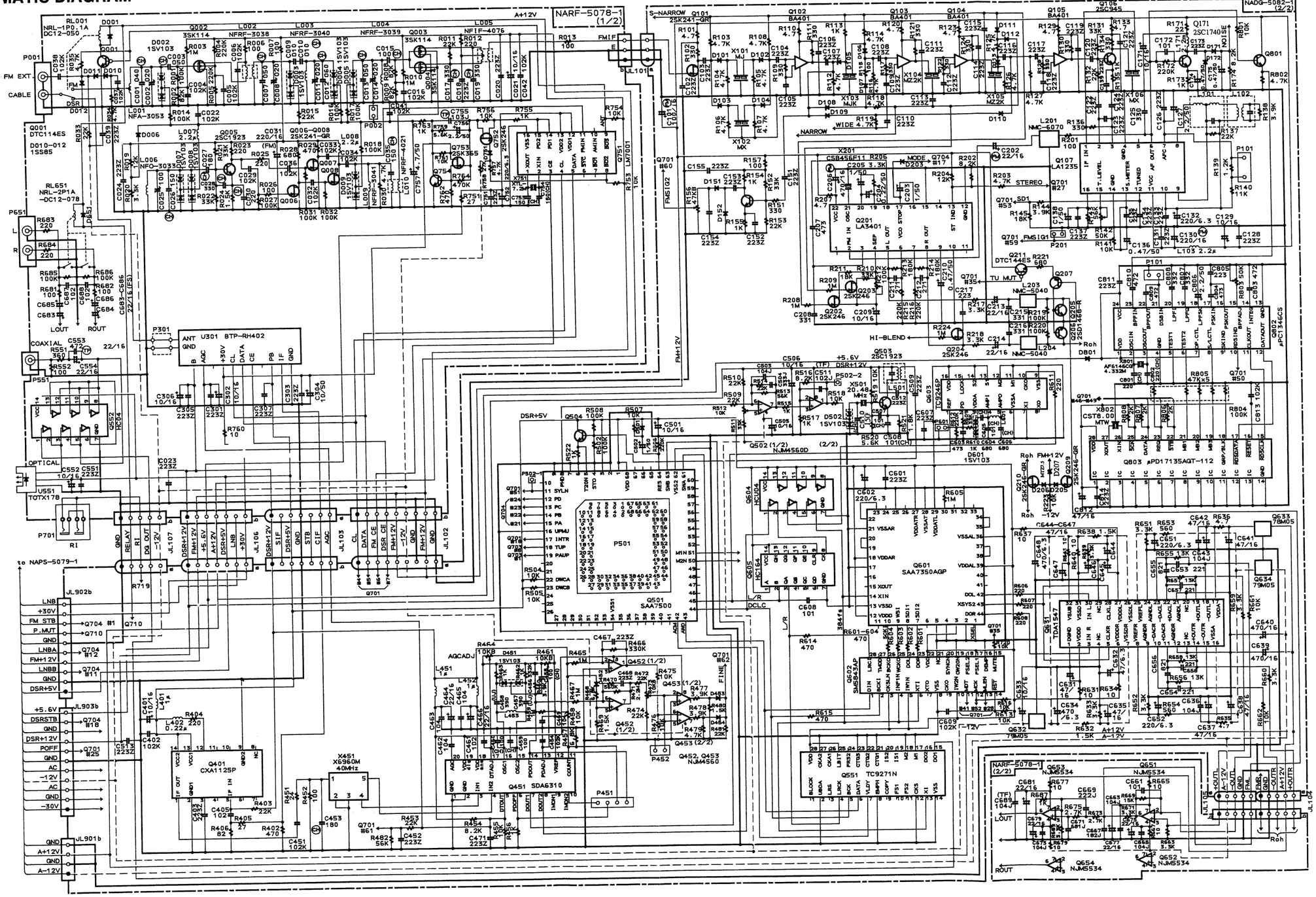
DIGITAL CIRCUIT PC BOARD

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE

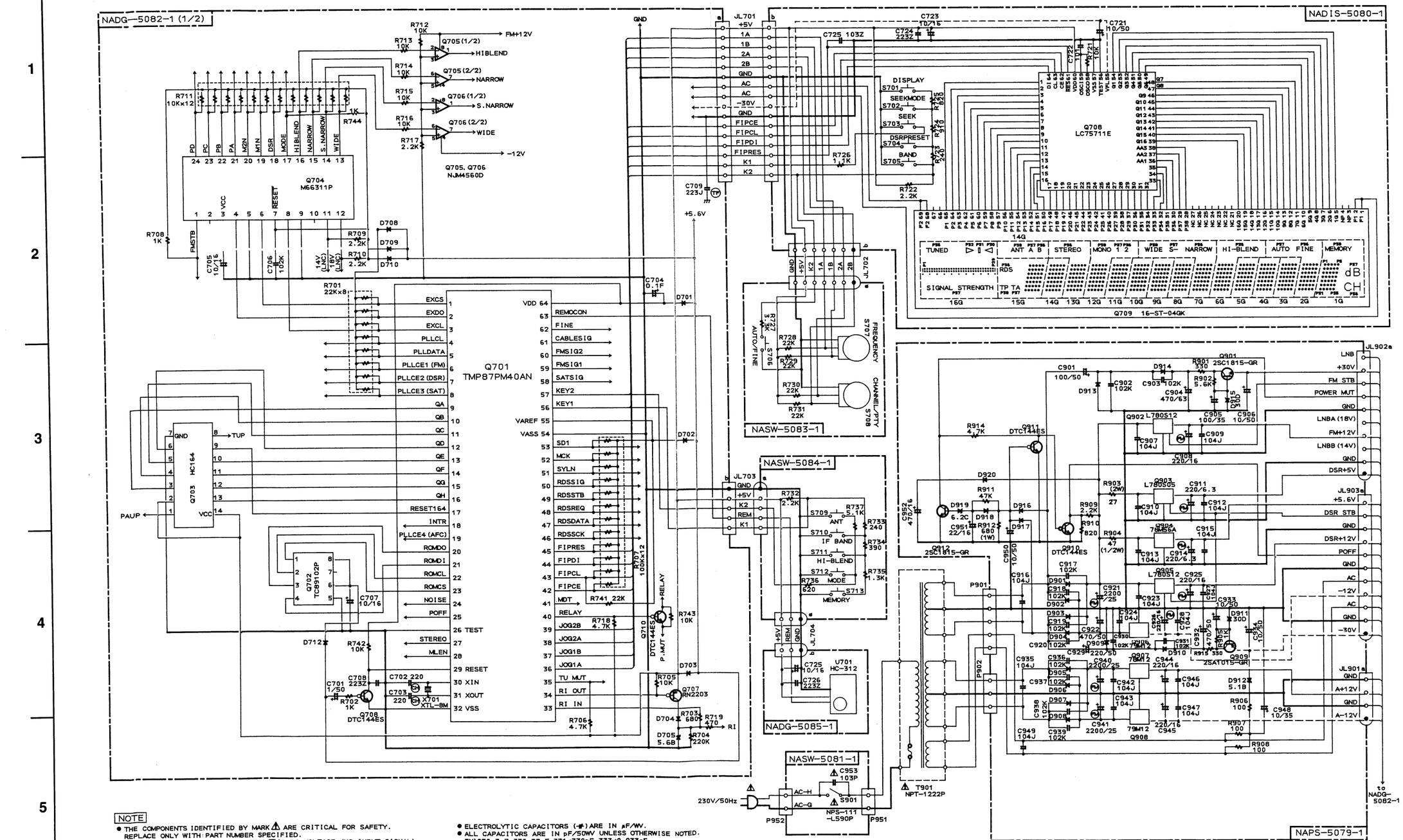


DIGITAL CIRCUIT PC BOARD

SCHEMATIC DIAGRAM



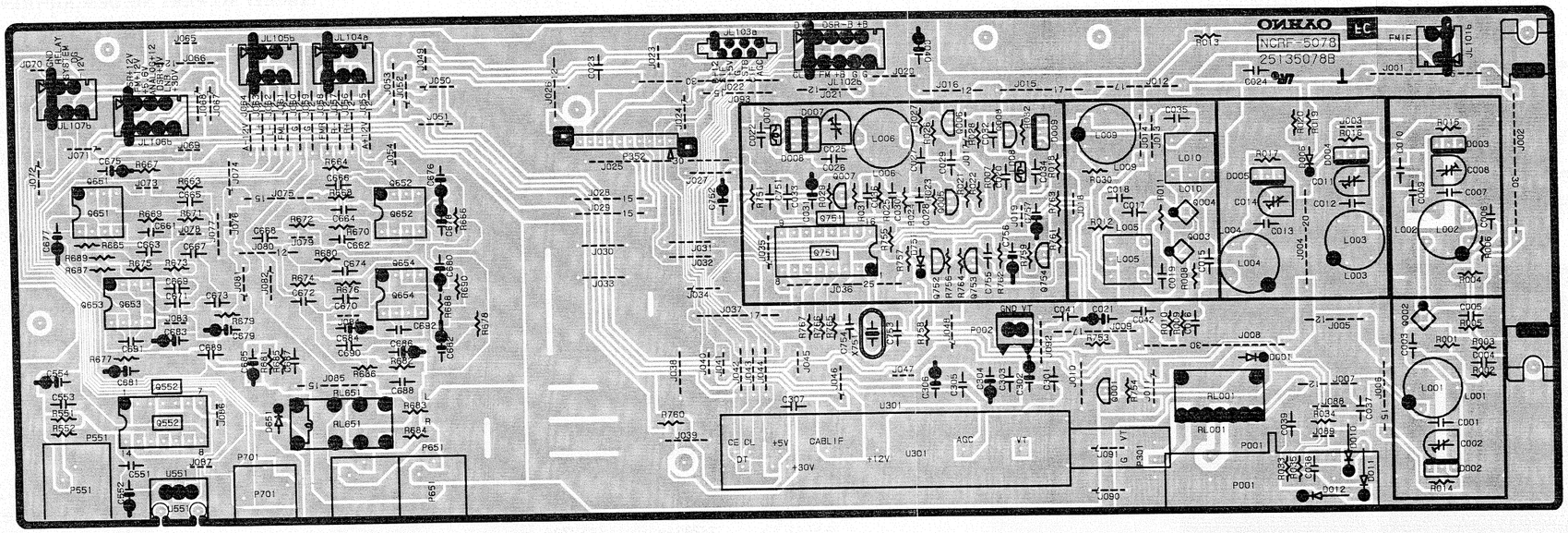
SCHEMATIC DIAGRAM



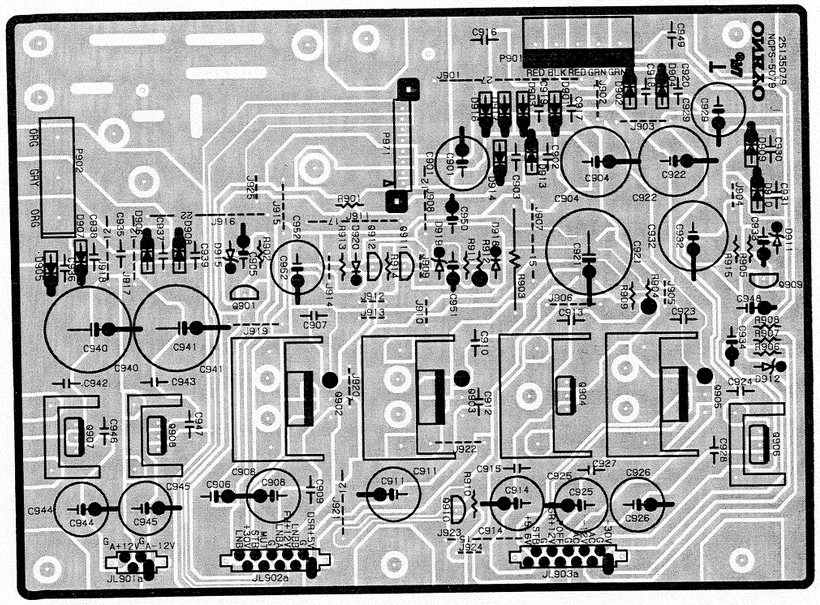
NOTE

- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE (MEASURED WITH VOLTMETER) □ IS DC VOLTAGE. (NO INPUT SIGNAL)
- ALL PNP TRANSISTORS ARE EQUIVALENT TO 2SA1015-GR UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE EQUIVALENT TO 2SC1815-GR UNLESS OTHERWISE NOTED.
- ALL DIODES ARE EQUIVALENT TO 1SS133 UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS (—) ARE IN μF/WV.
- ALL CAPACITORS ARE IN pF/50WV UNLESS OTHERWISE NOTED. EX) 030→3pF, 330→33pF, 331→330pF, 333→0.033μF
- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED.
- THE THICK LINES IN PC BOARD ARE THE PRINTING SIDE OF THE PARTS. EX) ▭▭▭ : PRINTING SIDE
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

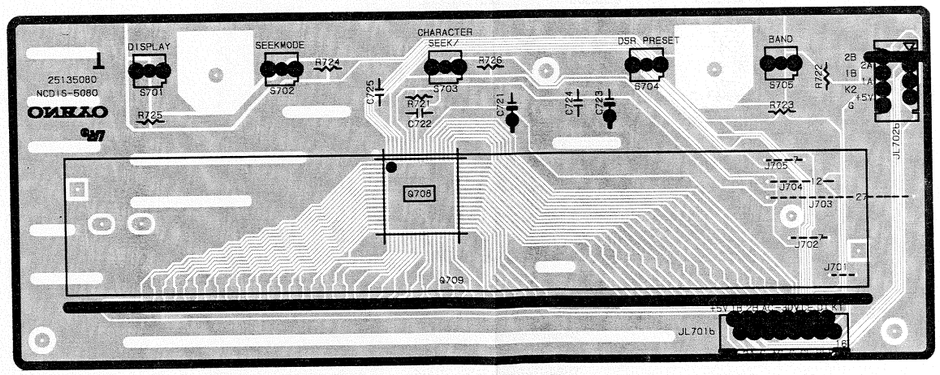
PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



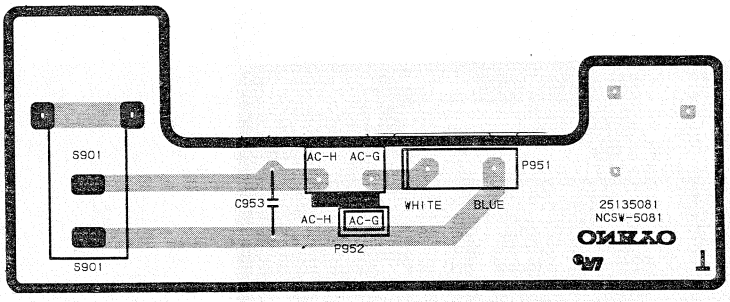
FRONT END AND OUTPUT PC BOARD



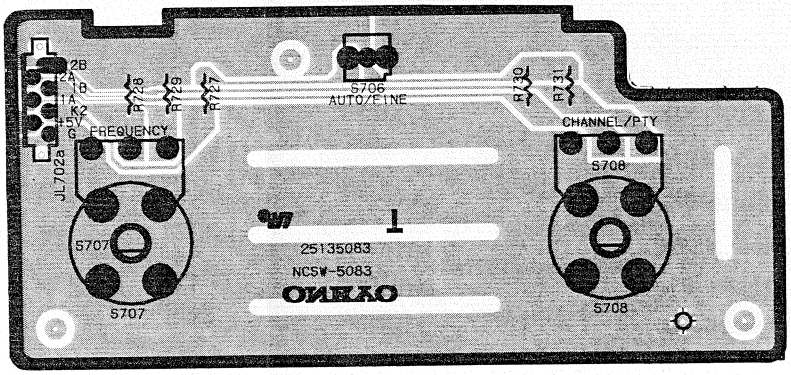
POWER SUPPLY CIRCUIT PC BOARD



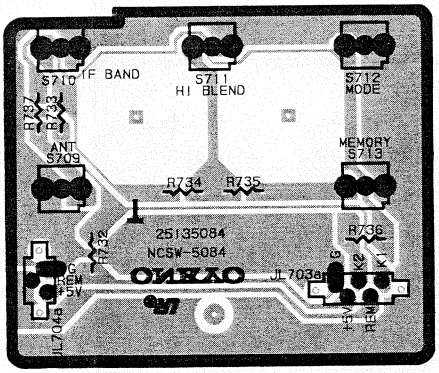
DISPLAY CIRCUIT PC BOARD



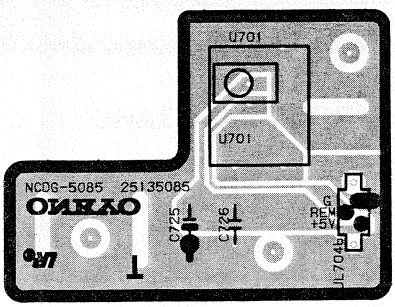
POWER SWITCH PC BOARD



ROTARY ENCODER PC BOARD



OPERATION SWITCH PC BOARD



REMOTE SENSOR PC BOARD

PRINTED CIRCUIT BOARD PARTS LIST

Front end and output pc board (NARF-5078-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Front end	
U301	240097	BTP-RH402, FRONTEND
	Photo coupler	
U551	24120031	TOTX178, PHT CP
	Transistors	
Q001	2214230 or	RN1202 or
	2213290	DTC114ES
Q002-Q004	2212514	3SK114-Y
Q005	2211723	2SC1923-O
Q006-Q008	2212195	2SK241-GR
Q752	2211945	2SK246-GR
Q753	2212445	2SK365-GR
Q754	2213284 or	2SC1740S-R
	2212115	2SC2458-GR
	ICs	
Q552	222740045	74HC04P
Q651-Q654	222762	NJM5534D-D
Q751	22240090	LM7001
	Diodes	
D001,D006	223222	WG713A,
D651,D751	223205 or	1SS270A or
	223163	1SS133
D002-D005	223154	1SV103
D007-D009	223154	1SV103
D010-D012	223149	1SS85
	Transformer	
L005	233441	NFIF-4076,IF
	Coils	
L001	233321A	NFA-3053,ANT
L002	233322A	NFRF-3038,RF
L003	233324A	NFRF-3040,RF
L004	233323A	NFRF-3039,RF
L006	233325A	NFO-3033,OSC
L007,L008	233454M022	NCH-1452,022M,CHOKE
L009	233326A	NFRF-3041,RF
L010	233212	NFRF-4021,RF
	Resonator	
X751	3010141	XTL-7.2M,CRYSTAL
	Capacitors	
C002,C008	3060021	NTC-2P17,Trimming
C011,C014	3060021	NTC-2P17,Trimming
C021	354741009	10μF,16V,Elect.
C025	3060017	NTC-10P15,Trimming
C031	393142217	220μF,16V,Elect.
C302,C306	354741009	10μF,16V,Elect.
C304	354781009	10μF,50V,Elect.
C552	354741009	10μF,16V,Elect.
C553	374723724	4700pF±5%,50V,Plastic
C554	354742209	22μF,16V,Elect.

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C661,C662	374721015	100pF±10%,50V Plastic
C663-C666	374721044	0.1μF±5%,50V,Plastic
C667,C668	374721824	1800pF±5%,50V,Plastic
C669,C670	374722224	2200pF±5%,50V,Plastic
C671,C672	374726814	4700pF±5%,50V,Plastic
C673,C674	374721044	0.1μF±5%,50V,Plastic
C675-C682	391642207	22μF,16V,Elect.
C683-C686	391642207	22μF,16V,Elect.
C689,C690	374721044	0.1μF±5%,50V,Plastic
C752	354722219	220μ F,6.3V, Elect.
C755	374721034	0.01μ F±5%,50V,Plastic
C756	354780229	2.2μ F,50V, Elect.
C757	354780479	4.7μ F,50V, Elect.
	Relaies	
RL001	25065356	NRL-1P0.1A-DC12-050
RL651	25065469	NRL-2P1A-DC12-078
	Terminals	
P001	25060202	NTM-2PD124, Antenna
P551	25045248	NPJ-1PDOR120, Coaxial output
P651	25045440	NPJ-2PDBL264, Output
P701	25045330	NPJ-2PDBL184, RI
	Plug	
P002	25055038	NPLG-2P29
	Antenna cable	
P301	2010102	
	Wire traps	
JL101b	25055624	NPLG-3P586
JL102b	25055630	NPLG-9P592
JL104b,JL105	25055626	NPLG-5P588
JL106b	25055628	NPLG-7P590
JL107b	25055626	NPLG-5P588
	Wire holder	
JL103a	25051091	NSCT-7P878
	Shield case	
	27301031-1	(FR)
	27301033-1	(RE)

Power supply circuit pc board (NAPS-5079-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q901,Q912	2211255	2SC1815-GR
Q909	2211455	2SA1015-GR
Q910,Q911	2213560 or	RN1204 or
	221282	DTC144ES
	ICs	
Q902	222781206	L780S12
Q903	222780506	L780S05

Q904	222780565JR	78M56
Q905	222781206	L780S12
Q906	222790125	79M12HF
Q907	222780125NE	78M12HF
Q908	222790125	79M12HF
	Diodes	
D901-D910	223380035 or	GP104003E or
D913,D914	223380046	AM01Z
D911,D915	224453004	MTZ30D, Zener
D912	224450512	MTZ5.1B, Zener
D916,D917	223380035 or	GP104003E or
	223380046	AM01Z
D918	223222,	WG713A,
D920,D921	223205 or	1SS270A or
	223163	1SS133
D919	224450623	MTZ6.2C, Zener
	Capacitors	
C901	354781019	100μ F,50V,Elect.
C904	354774719	470μ F,63V,Elect.
C905	354761019	100μ F,35V,Elect.
C906,C933	354781009	10μ F,50V,Elect.
C907	374721044	0.01μ F±5%,50V,Plastic
C908	393142217	220μ F,16V,Elect.
C909,C910	374721044	0.01μ F±5%,50V,Plastic
C911,C914	393122217	220μ F,6.3V,Elect.
C912,C913	374721044	0.01μ F±5%,50V,Plastic
C915,C916	374721044	0.01μ F±5%,50V,Plastic
C921	393152227	2200μ F,25V,Elect.
C922,C932	354784719	470μ F,50V,Elect.
C923,C924	374721044	0.01μ F±5%,50V,Plastic
C925,C926	393142217	220μ F,16V,Elect.
C927,C928	374721044	0.01μ F±5%,50V,Plastic
C929	354782219	220μ F,50V,Elect.
C934,C950	354781009	10μ F,50V,Elect.
C935	374721044	0.01μ F±5%,50V,Plastic
C940,C941	393152227	2200μ F,25V,Elect.
C942,C943	374721044	0.01μ F±5%,50V,Plastic
C944,C945	393142217	220μ F,16V,Elect.
C946,C947	374721044	0.01μ F±5%,50V,Plastic
C948	354761009	10μ F,35V,Elect.
C949	374721044	0.01μ F±5%,50V,Plastic
C951	354742209	22μ F,16V,Elect.
C952	354744719	470μ F,16V,Elect.
	Resistors	
R903	441722704	RS2WBJ, 27, Metal oxide
R904	443524704	RS1/2WBJ, 47, Metal oxide
R912	443626814	RS1WBJ, 680, Metal oxide
	Plug	
P901	25055168	NPLG-5P152, P PLUG
	Wire holders	
JL901a	25051088	NSCT-4P875
JL902a	25051094	NSCT-10P881
JL903a	25051095	NSCT-11P882
	Radiators	
	27160179	RAD-57
	27160220-1	RAD51(B)
	Screws	
	82143006	3P+6FN(BC),Pan head
	Holder	
	27190540-1	

Display circuit pc board (NADIS-5080-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q708	22240642	LC75711E
	FL tube	
Q709	212136	16-ST-04GK
	Capacitors	
C721	354781009	10μ F,50V,Elect.
C723	354741009T	10μ F,16V,Elect.
	Switches	
S701-S705	25035652T	NPS-111-S604, Push
	Socket	
JL701b	25051282	NSCT-16P1071
	Wire trap	
JL702b	25055628	NSCT-7P590
	Holder	
	27190949	Fl tube

Power switch pc board (NASW-5081-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitor	
C953	3500065A	DE7150FZ103P, AC400V/125V, IS C
	Switch	
S901	25035636	NPS-111-L590
	Plug	
P952	25055675	NPLG-2P631

Digital Circuit pc board (NADG-5082-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Transistors	
Q101	2212195	2SK241-GR
Q106	2210746	2SC945A-P
Q151,Q171	2213284 or	2SC1740S-R or
Q504,Q801	2212115	2SC2458-GR
Q202-Q204	2211945	2SK246-GR
Q205,Q206	2212794	2SD1468-R
Q207	2213354 or	2SA933S-R or
	2212125	2SA1048-GR
	Transistors	
Q209,Q210	2211945	2SK246-GR
Q211	2213560 or	RN1204 or
	221282	DTC144ES
Q503	2211723	2SC1923-O

Q707	2213580 or	RN2203 or
	2212600	DTA124ES
Q708,Q710	2213560 or	RN1204 or
	221282	DTC144ES
	ICs	
Q102-Q105	22240821	BA401
Q107	222680	LA1235
Q201	22240252	LA3401
Q401	22240816	CXA1125P
Q451	22240817	SDA6310
Q452,Q453	222579	NJM4560D
Q501	22240818	SAA7500
Q502	222579	NJM4560D
Q551	22240833	TC9271N
Q601	22240655	SAA7350AGP
Q602	22240680-1	SM5843AP
Q603	22240820	TC9246P
Q604	222755	TC74HCU04P
Q605,Q703	222741645	74HC164
Q631	22240654	TDA1547
Q632,Q634	222790055	79M05FA
Q633	222780055NEC	78M05HF
Q701	22240814	TMP87PM40AN
Q702	22240475	TC89102P
Q704	22240815	M66311P
Q705,Q706	222579	NJM4560D
Q802	22240679	MPC1346CS
Q803	22240639A	MPD17135AGT -112
	Diodes	
D101-D113	223222,	WG713A,
D151,D152	223205 or	1SS270A or
D171,D172	223163	1SS133
D201-D203	223222,	WG713A,
D205,D206	223205 or	1SS270A or
D452-D454	223163	1SS133
D207	224450753	MTZ7.5C, Zener
D451,D502	223154	1SV103
D501,D551	223222,	WG713A,
D701-D712	223205 or	1SS270A or
D801	223163	1SS133
D601	223154	1SV103
	Transformers	
L101	233459	NFIF-4083, IF
L102	233460	NFIF-4084, IF
	Coils	
L103	233454M022	NCH-1452, 022M, Choke
L171	231081	NCH-2129, Choke
L201	233383	NMC-6070, MPX
L203,L204	233294	NMC-5040, MPX
L401	233454M010	NCH-1452, 010M, Choke
L402	233454M229	NCH-1452, 229M, Choke
L451,L452	233454M010	NCH-1452, 010M, Choke
L453	233461	NVRF-4066, RF
L501	233462	NVRF-4067, RF
L601	233463	NVO-4063, OSC
	Ceramic filters	
X101,X103	3010132	SFE10.7MJK-A
X102,X106	3010041	SFE10.7MX-A
X104,X105	3010130	SFE10.7MZ2K-A
	Resonators	
X201	3010152	CSB456F11, Ceramic
X501	3010237	XTL-20.48M, Crystal
X701	3010236	XTL-8M, Crystal
X801	3010203	AF6146CG, Crystal
X802	3010190	CST8.00MTW, Ceramic
	Filter	
X451	3010235	X6960M, SAW
	Capacitors	
C101	393141017	100μ F,16V,Elect.
C127	354780229	2.2μ F,50V,Elect.
C129,C171	354741009	10μ F,16V,Elect.
C130	393142217	220μ F,16V,Elect.
C132	354722219	220μ F,6.3V,Elect.
C136	354784799	0.47μ F,50V,Elect.
C138	354780109	1μ F,50V,Elect.
C174,C175	354784799	0.47μ F,50V,Elect.
C202	393142207	22μ F,16V,Elect.
C203,C205	354780109	1μ F,50V,Elect.
C204	354782299	0.22μ F,50V,Elect.
C206	393144717	470μ F,16V,Elect.
C207	374724734	0.047μ F±5%,50V,Plastic
C208	374723315	330pF±10%,50V,Plastic
C209	393141007	10μ F,16V,Elect.
C210	354741009	10μ F,16V,Elect.
C211,C212	374722715	270pF±10%,50V,Plastic
C213,C214	393142207	22μ F,16V,Elect.
C215.C216	374723315	330pF±10%,50V,Plastic
C217	374722234	0.022μ F±5%,50V,Plastic
C401,C501	354741009	10μ F,16V,Elect.
C462,C463	374721044	0.1μ F±5%,50V,Plastic
C464,C466	354742209	22μ F,16V,Elect.
C465,C469	374721044	0.1μ F±5%,50V,Plastic
C502,C701	354780109	1μ F,50V,Elect.
C503	374724724	4700pF±5%,50V,Plastic
C504	374723334	3300pF±5%,50V,Plastic
C505,C506	354741009	10μ F,16V,Elect.
C511	374721024	1000pF±5%,50V,Plastic
C602	354722219	220μ F,6.3V,Elect.
C603,C804	374724734	0.047μ F±5%,50V,Plastic
C631,C632	393144707	47μ F,16V,Elect.
C633	393141007	10μ F,16V,Elect.
C634,C648	393124717	470μ F,6.3V,Elect.
C635,C637	393144707	47μ F,16V,Elect.
C636,C643	374721044	0.1μ F±5%,50V,Plastic

C638	393144707	47µ F,16V,Elect.
C639,C640	393144717	470µ F,16V,Elect.
C641,642	393144707	47µ F,16V,Elect.
C644	393144707	47µ F,16V,Elect.
C645-C647	393144707	47µ F,16V,Elect.
C651,C652	393122217	220µ F,6.3V,Elect.
C653,C654	374722715	270pF±10%,50V,Plastic
C655,C656	374721024	1000pF±5%,50V,Plastic
C657,C658	374722715	270pF±10%,50V,Plastic
C704	3000076 or 3000078	EECS5R5T104, or DX-5R5L104, Super
C705,C707	354741009	10µ F,16V,Elect.
C709,C805	374722234	0.022µ F±5%,50V,Plastic
C803	374724724	4700pF±5%,50V,Plastic
C806	354780229	2.2µ F,50V,Elect.
C807,C808	374723324	3300pF±5%,50V,Plastic
C809,C810	374724724	4700pF±5%,50V,Plastic
C812	354744709	47µ F,16V,Elect.
	Resistors	
R141	5210262	N06HR10KBC, Trimming
R142	5210261	N06HR5KBC, Trimming
R156	5210265	N06HR50KBC, Trimming
R212	5210266	N06HR100KBC, Trimming
R461,R464	5210262	N06HR10KBC, Trimming
R473,R512	5210262	N06HR10KBC, Trimming
R501	49121223404	RM1/8GJ, 22K × 4, Array
R701	49163223408	RM1/10IJ, 22K × 8, Array
R707	49163104412	RM1/10IJ, 100K × 12, Array
R711	49121103412	RM1/8GJ, 10K × 12, Array
R803	5210265	N06HR50KBC, Trimming
R805	49163473405	RM1/10IJ, 47K × 5, Array
	Plug	
P101,P451	25055045	NPLG-4P33
P201,P452	25055038	NPLG-2P29
P502,P601	25055038	NPLG-2P29
	Wire holders	
JL101a	25051087	NSCT-3P874
JL102a	25051093	NSCT-9P880
JL104a,JL105a	25051089	NSCT-5P876
	Wire holders	
JL106a	25051091	NSCT-7P878
JL107a	25051089	NSCT-5P876
	Wire traps	
JL103b	25055628	NPLG-7P590
JL703b	25055626	NPLG-5P588
JL901b	25055625	NPLG-4P587
JL902b	25055631	NPLG-10P593
JL903b	25055632	NPLG-11P594
	Sockets	
P501	25050900	NSCT-68P695, IC
JL701a	25051282	NSCT-16P1071
	Shield plate	
	27150348	

Rotary encoder pc board (NASW-5083-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Switches	
S706	25035652T	NPS-111-S604, Push
S707	25065494	EC16B25B0, Rotary encoder
S708	25065481	EC16B25B0, Rotary encoder
	Wire holder	
JL702a	25051091	NSCT-7P878

Operation switch pc board (NASW-5084-1)

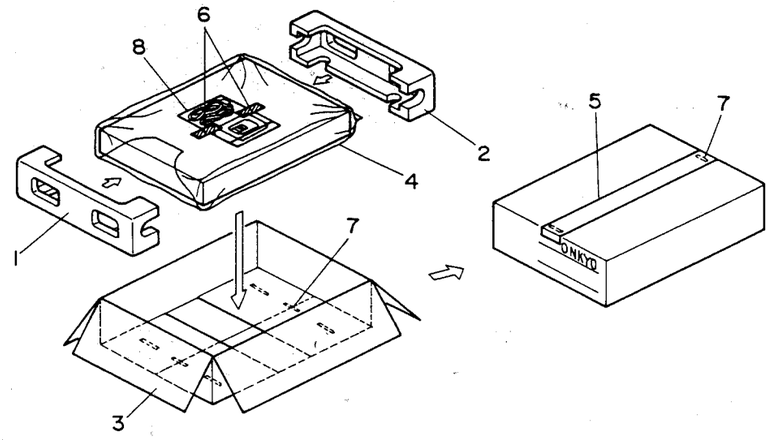
CIRCUIT NO.	PART NO.	DESCRIPTION
	Switches	
S709-S713	25035652	NPS-111-S604, Push
	Wire holders	
JL703a	25051089	NSCT-5P876
JL704a	25051087	NSCT-3P874

Remote sensor pc board (NADG-5085-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
U701	24130010	HC-312,Remote sensor
C725	354741009	10µ F,16V,Elect. capacitor
JL704b	25051087	NSCT-3P874,Wire holder

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

PACKING VIEW



REF. NO.	PART NO.	DESCRIPTION
1	29091574	Pad L
2	29091575	Pad R
3	29052810	Master carton box
4	29100037-1Y	Styren bag
5	29110071	PP tape
6	261504	Adhesive tape
7	282321	Eight staples
8	Accessary bag ass'y	
	29342024	Instruction manual
	3010554	UM-3, Two batteries
	2010098A	Connection cord
	2010200	Cord RI
	292112	FM antenna
	24140284	RC-284T, Remote control
	29100037-1Y	Styren bag
	29365020J	Warranty card
	29100094B	Bag for warranty card

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